Illinois Department of PUBLIC HEALTH

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Illinois Hospitals Reduce Surgical Site Infections (SSI)
Knee Arthroplasty (KPRO)

Surgical Site Infections (SSI) Overview

Illinois hospitals have been reporting surgical site infection (SSI) data to the Illinois Department of Public Health (IDPH) using the CDC's National Healthcare Safety Network (NHSN) since April, 2010. SSIs are infections that occur in the wound created by an invasive surgical procedure and are one of the most important causes of healthcare-associated infections (HAI). The surgeries monitored for SSI in Illinois include coronary artery bypass surgery (CABG) procedures, and knee replacement (KPRO) surgery. This report and analysis reflects the July 1, 2012 to June 30, 2013 SSI data of Illinois hospitals that performs KPRO.

The CDC describes three types of surgical site infections:

- **Superficial incisional SSI.** This infection occurs just in the area of the skin where the surgical incision was made.
- **Deep incisional SSI.** This infection occurs beneath the incision area in muscle tissue and in fascia, the tissue surrounding the muscles.
- **Organ or space SSI.** This type of infection can be in any area of the body other than skin, muscle, and fascia that was involved in the surgery, such as a body organ or a space between organs.

IDPH monitors inpatient procedures and Deep Incisional Primary and Organ/Space SSIs that were identified during admission or readmission to Illinois facilities as defined in the NHSN Manual.

Standardized Infection Ratio (SIR)

Facilities' surgical site infection results are compared using the standardized infection ratio (SIR). The SIR is a risk adjusted summary measure that accounts for the type of procedure and patient risk. It is the ratio of the observed to expected (or predicted) number of SSI (observed / predicted = SIR). The predicted number of infections is calculated based on national infection data and patient risk at each health facility. A hospital's SIR value is compared to the baseline U.S .experience (i.e. NHSN aggregate 2006-2008 data). If the SIR value is greater than 1.0, there are more infections than expected. If the SIR value is less than 1.0, then fewer infections occurred than expected. And if the facility SIR is 1.0, then the number of observed infections is the same as or similar to the national infection rate. A statistical test (Poisson test) is used to determine if the difference is statistically significant.

The three categories summarizing how a hospital compares to the national infection data for procedure performed:

- Statistically fewer (Lower) infections than expected based on national infection data;
- Statistically similar (Similar) infections as expected based on the national infection data; or
- Statistically more (Higher) infections than expected based on national infection data.

For additional information on Standardized Infection Ratios (SIRs), and confidence intervals (CIs), see the methodology section of the Illinois Hospital Report Card website:
http://www.healthcarereportcard.illinois.gov/methodology

Table 1. Summary of KPRO SSI Data, Year 2010 – 2012*

Reporting Year *	Number of Facilities reporting	Total Number of KPRO Performed	Number of Infections (SSI)		Standardized Infection Ratio (SIR)	95% Confidence Interval (SIR)		p-value	Statistical Interpretation
			Observed	Predicted		Lower Bound	Upper Bound		
2010	129	27237	121	173.37	0.70	0.58	0.83	< 0.001	Lower
2011	135	26860	120	173.16	0.69	0.58	0.83	< 0.001	Lower
2012	139	27534	79	177.06	0.45	0.36	0.55	< 0.001	Lower

*NOTE: Actual Reporting Period is July 1st – June 30th of the Reporting Year

Table 1 provides a snapshot summary of Knee Arthroplasty (KPRO) SSI in Illinois hospitals from 2010 to 2013. Each year shown on the table represents a reporting period from July 1 to June 30. For all years shown, the numbers of observed SSI compared to the number of predicted SSI have been declining, with all the SIR values being < 1.0. These are all statistically significant compared to the national referent period noted above in the SIR overview.

As shown in the following Tables and Figures, significant reductions in KPROs have been observed since Illinois hospitals have started reporting KPRO SSI in 2010. The reduction of KPRO SSI from 2010 to 2011 was approximately 1%, from 2011 to 2012 was 35%, and from 2010 to 2012 was 36%. Data from 2011 to 2012 were statistically significant reductions in SSI.

Table 2. Changes in SIR in Illinois SSI, 2010 compared to 2011: KPRO

Year *	2010	2011	Percent Change	Significant Change	p-value
SIR	0.70	0.69	-1.43%	No	0.9562

Table 3. Changes in SIR in Illinois SSI, 2011 compared to 2012: KPRO

Year *	2011	2012	Percent Change	Significant Change	p-value
SIR	0.69	0.45	-34.78%	Decrease	0.0022

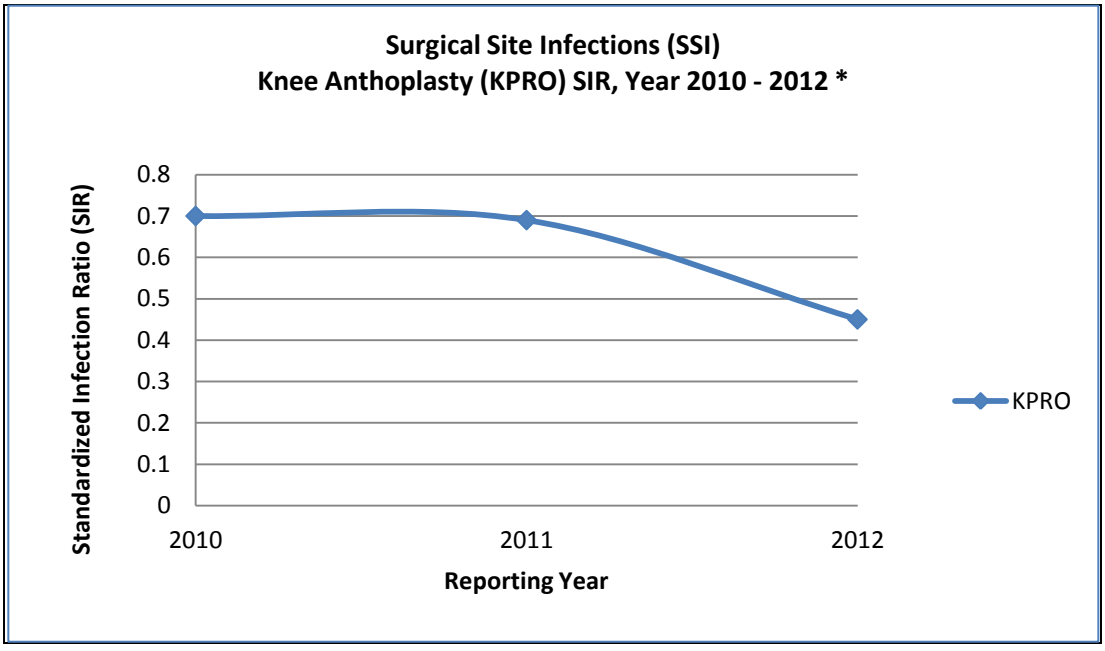
Table 4. Changes in SIR in Illinois SSI, 2010 compared to 2012: KPRO

Year *	2010	2012	Percent Change	Significant Change	p-value
SIR	0.70	0.45	-35.71%	Decrease	0.0018

Table 5. Changes in Standardized Infections Ratios (SIRs) in Illinois KPRO SSI from 2010 - 2012

Reporting Year *	2010	2011	2012
Standardized Infection Ratio (SIR)	0.70	0.69	0.45

Figure 1. SIR of KPROs in Illinois Hospitals from 2009 - 2012



Summary

KPRO SSI trend analysis indicates consistent decreases in the number of KPRO SSIs reported in Illinois hospitals combined between 2010 and 2012, as reflected in the decreased SIR. The overall decrease in the number of KPRO SSIs reported in all Illinois hospitals combined is statistically significant since 2010. The SIR values for KPRO SSIs are trended over time in Figure 1.